

Work Order ID 86693

86693

Page 1

July-06-12 11:33:53 AM

Item ID: D206-667-101

Accept

N900040100

Setup Start *NS1*

Revision ID:

Stop *NS2*

Item Name: Crossstube Fwd

Start Date: 7/06/12 Start Qty: 1.00

1

Cust Item ID:

Required Date: 8/17/12 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan:

Date: 12-07-11 Tooling:

Date:

QC:

Date: SPC (Y/N):

Date:

Run Start *NR1*

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr	Revision Nbr
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D206-667-141	Rev C (DEO)
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DSI9565	A
---------	---

100

0.00

100

DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile and create labels as per PPP D206-667-101

CHG004

110

0.00

110

Packaging

Packaging

Memo

0.00

Packaging

12-7-26

12-7-16

W/O: 86693		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D206-667-101 PAR #: _____ Fault Category: x-tube NCR: Yes ☒ No ☐ DQA: AKL Date: 12/08/02
 Resolution: _____ Disposition: use as is QA: N/C Closed: AKL Date: 12/8/02

NCR: 12-11645		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
12.07.12	12D	CRUSHING AFTER BENDING IS OVER TOLERANCE. Height IS OVER TOLERANCE R.C. PROCESS.	CP 12.07.16	Acceptable per attached SR	12/7	S 12/08/02 DAS 10	CP 12.07.16	S 12/08/02 DAS 16
		BENDING						

NOTE: Date & initial all entries

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Stop *NS2*

Item Name: Crosstube Fwd

Start Date: 7/06/12 Start Qty: 1.00 *1*

Cust Item ID:

Required Date: 8/17/12 Req'd Qty: 1.00 *1*

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start *NR1*

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
120	BENDING MACHINE - CROSSTUBES	0.00							
120									
CNC Bend 1	Memo	0.00							
CNC Delta 100 Bender	Bend tube as per Dwg D206-667-141 using CNC bender program 206B-fw and Folio FT _____								
130	QC15- Crosstube Dimensional Check	0.00							
130									
QC	Memo	0.00							
Quality Control									

DP 12-7-16

DAS 16 17/07/16

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start *NR1*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
140	Crosstubes	0.00							
140		0.00							
Crosstubes	Memo								
Crosstubes	1-Drill holes & ream using drill Jig DT8541 & DT8542 as per Dwg D206-667-141. Drill all (3) top holes.								
	3-Flip tube and switch drilling Jigs from right to left, left to right. Locate Jigs off existing holes using "T" pins.								
	4-Drill pilot holes using drill Jig DT8541 & DT8542 as per Dwg D206-667-141. Drill only the top (2) holes.								
	5-Drill pilot holes as per Dwg D206-667-141. Drill only the top (2) holes.								
	6-Drill Fwd rivet holes using drill Jig DT8787FWD as per Dwg D206-667-141. Note: Fwd side has 3x top holes.								
	7-Drill Aft rivet holes using drill Jig DT8787AFT as per Dwg D206-667-141.								
	8-C'sink holes as per Dwg D206-667-141. Allow rivet to sit below surface to compensate for paint.								
	9-Scribe part # and batch # using vibrating stylus as per Dwg D206-667-141 Inside of Cuff (Do not engrave on outside of tube)								
	10-*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE*** Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D206-667-141								

MO 12-7-18

> MO 12-7-19

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150 *150* QC Quality Control	QC5- Inspect part completeness to step on W/O Memo *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***	0.00 0.00							
160 *160* HandFXtube Hand Finishing Crosstubes	HandFXtube Memo *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE*** 1- CLEAN CROSSTUBE WITH WASH'N WIPE	0.00 0.00							AL 12-7-20
180 *180* Outsource2 Outsource process - NDT	Outsource process - NDT per QSI038 4.1 Memo *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE*** Liquid Penetrant Inspection as per QSI 038Or Issue P/O: 17509 LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order	0.00 0.00							OK 12/07/20

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Cust Item ID:

Required Date: 8/17/12 Req'd Qty: 1.00 ***1***

Customer:

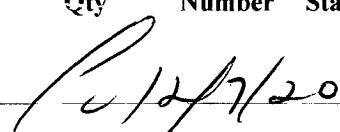

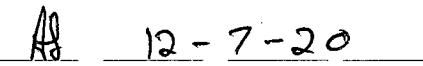
Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
190 *190* Packaging Packaging	Packaging Memo *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE*** Ensure copy of NDT results attached to work order.	0.00 0.00							
200 *200* QC Quality Control	QC5- Inspect part completeness to step on W/O Memo *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE*** Inspect for damage & ensure results are as per Dwg D206-667-103	0.00 0.00							
202 *202* HandFXtube Hand Finishing Crosstubes	 Memo *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE*** 1- PRESSURE WASH AND THEN USE WASH'N WIPE TO CLEAN CROSSTUBE BEFORE CHEMICAL CONVERSION	0.00 0.00							

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Cust Item ID:

Required Date: 8/17/12 Req'd Qty: 1.00 *1*

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start *NR1*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
205	QC7-Inspect Chemical Conversion Coat	0.00							
205									
QC	Memo	0.00							
Quality Control	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
210		0.00							
210	SprayPaint								
SprayPaint	Memo	0.00							
Spray Painting	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	I-Prime inside and outside crosstube as per QSI 005 4.2.1								
	***** Let tube sit up right for 30mins before hanging*****								
	P4500-P-23 Base Batch: 117319								
	P4500-C-23 Catalyst Batch: 117319								
	Start time: 8:00 Finish: 9:00								

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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start *NR1*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
230		0.00							
230	SprayPaint	0.00				1			N 12-07-12
SprayPaint	Memo	0.00							
Spray Painting	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	1-Paint outside crosstube with White Imron as per QSI 005								
	4.2								
	Imron 55U white paint	Batch: 122831							
	Imron 125S activator	Batch: 122831							
	Start: 2:00	finish: 3:00							
240	QC14- Inspect Spray Paint	0.00							
240									
QC	Memo	0.00							
Quality Control									

DAS
16
12/07/12

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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250

0.00

250

Crosstubes

Crosstubes

Memo

0.00

1-Abrade mating surfaces of support and crosstube with 400 grit sandpaper,
clean the area with 4105S wash 'n' wipe

2-Install supports with Proseal 890 per DSI9565 and QSI 015

A/R Proseal 890 Batch: 122447

3- Torque bolts as per dwg

3-Install nut plates as per Dwg D206-667-141. Touch-up rivet heads with Imron
paint.AB 12-7-24

260

QC5- Inspect part completeness to step on W/O

0.00

260

QC

Memo

0.00

Quality Control

1 12-07-26

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start *NR1*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

270

Pick Kit

0.00

270

Packaging

Memo

0.00

Packaging

12/7/2012

280

QC4- 100% Inspect kits for completeness

0.00

280

QC

Memo

0.00

Quality Control

DAS 16 0-00 12/14/12

TC

290

Packaging

0.00

290

Packaging

Memo

0.00

Packaging

Identify and pack for shipping as per PPP D206-667-101

Location: 120053

PPP Rev: 12

12/12/12 TC

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
300	QC21- Final Inspection - Work Order Release	0.00							
300									
QC	Memo	0.00							
Quality Control									

12/1/30
MF
12-07-27

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Picklist Print

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Parent Item: D206-667-101

Parent Item Name: Crosstube Fwd

Start Date: 7/06/12

Required Date: 8/17/12

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:F05.09.01Add holes for compatibility with Bell SkidtubesKJ/JLM
 IPP Rev:G 08-06-03 update as per DSI9415 (ECN1198) DD verified by:ec
 IPP Rev:H 08-07-28 update as per (par 08-013) DD verified by:EC
 IPP Rev J 09.01.06 Per ECN 08-562 EC verified by:DD !PP REV:K 11.08.05 PER ECN
 11-615 DD VERF:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
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AN530A BOLT		Purchased	No			270	Each	115.0000	4	4			
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Location	Loc Qty	Loc Code
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ST339	115	
117514	7	
120423	3	
120910	25	
121259	30	
122141	50	

AN532A Bolt		Purchased	No			270	Each	277.0000	4	4			
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Location	Loc Qty	Loc Code
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ST339	177	
119862	2	
120423	75	
122151	100	
ST340	100	
121541	100	

AN57A Bolt		Purchased	No			270	Each	2,564.0000	10	10			
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Location	Loc Qty	Loc Code
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ST337	2564	
119017	2564	

AN960JDS16 Washer	NAS1149D0563J	Purchased	No			270	Each	12.0000	18	18			
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Location	Loc Qty	Loc Code
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ST338	12	
2612	12	

10 18 4x 14x
 1117291 1119546 12/18/12

W/O:		WORK ORDER CHANGES					
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Parent Item: D206-667-101

Parent Item Name: Crosstube Fwd

Start Date: 7/06/12

Required Date: 8/17/12

Start Qty: 1.00

Required Qty: 1.00

D2873-043	Manufactured	No	250	Each	80.0000	2	2	AS 12-7-24
Nut Plate Assembly								

Location	Loc Qty	Loc Code
LG052	80	
72644	2	
82949	38	
84386	40	

D2873-045	Manufactured	No	250	Each	33.0000	2	2	AS 12-7-24
Nut Plate Assembly								

Location	Loc Qty	Loc Code
LG052	33	
82947	33	

D2891-1	Manufactured	No	250	Each	37.0000	2	2	AS 12-7-24
2.25 Support								

Location	Loc Qty	Loc Code
LG051	20	
84164	20	
LG052	17	
72822	1	
75176	1	
82277	15	

D3595-063-395	Manufactured	No	250	Each	46.0000	4	4	AS 12-7-24
RUBBER CUSHION								

Location	Loc Qty	Loc Code
LG051	46	
82223	46	

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Shop Packet Print

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Dart Aerospace Ltd

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Start Date: 7/06/12

Required Date: 8/17/12

Start Qty: 1.00

Required Qty: 1.00

MS20601-AD4W8
RIVET

Purchased No

250 Each 244.0000 14

14 AP 12-7-24

Location Loc Qty Loc Code

LG051 33

121017 33

ST314 200

121827 100

122141 100

ST322 11

121255 11

 MS21042L5
Nut

Purchased No

270 Each 1,218.0000

 4

5/4 AP 12-7-24

Location Loc Qty Loc Code

300 500

121652 500

ST300 718

108827 4

116105 5

116548 43

119109 654

17651 4

2937 8

MS21920-20

Purchased No

270 Each 127.0000

4 4

AP 12-7-24

Location Loc Qty Loc Code

LG050 127

116799 8

120676 8

121067 2

121274 34

122254 75

(4)

July-06-12 11:33:53 AM

Shop Packet Print

Page 3

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

July-06-12 11:33:53 AM

Page 4

Work Order ID: 86693

Parent Item: D206-667-101

Parent Item Name: Crosstube Fwd

Start Date: 7/06/12

Required Date: 8/17/12

Start Qty: 1.00

Required Qty: 1.00

D206-667-101TRN

Manufactured No

110

Each

2.0000

1

Crosstube Turning Detail

Location

Loc Qty

Loc Code

LG

2

84018

1

84019

1

7

DP 12-7-16

July-06-12 11:33:53 AM

Shop Packet Print

Page 4

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

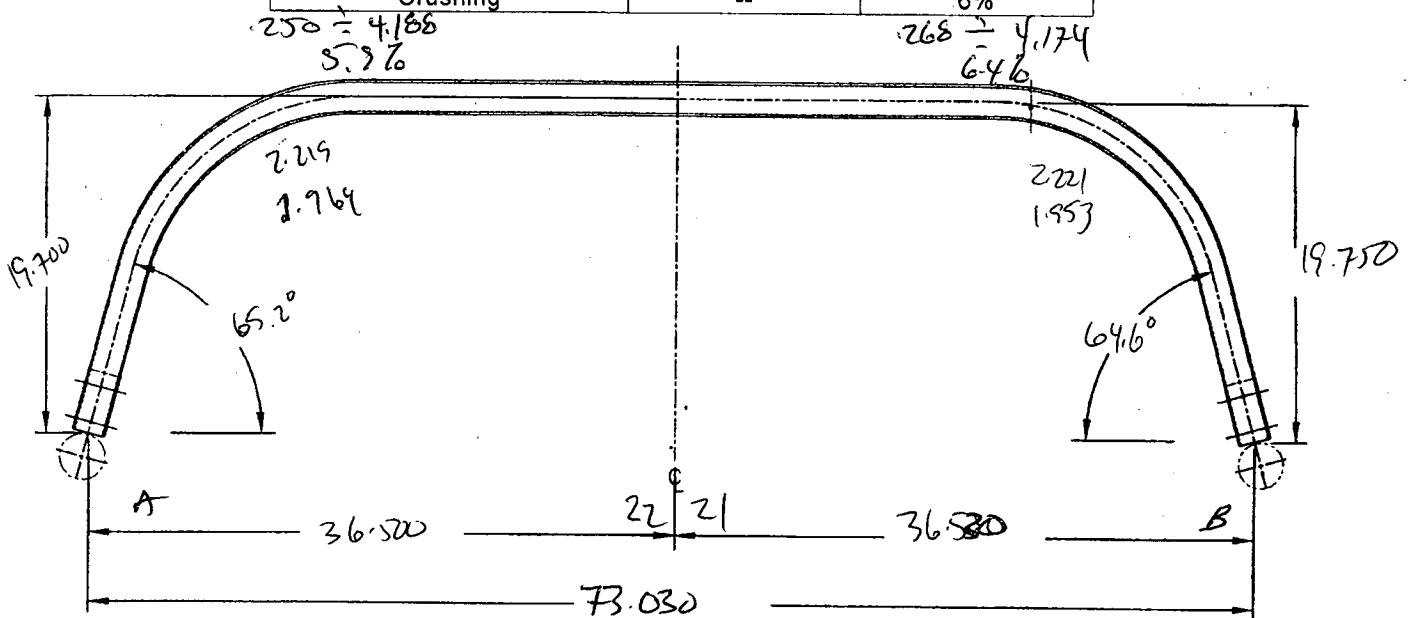
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order: 86693	
Description: Crosstube High Fwd (206B)		Part Number: D206-667-101	
Inspection Dwg: D206-667-141		Rev: C	Page 1 of 1

Required Dimension	Min	Max
Height	19.41	19.67
1/2 Span	36.47	36.73
Angle	65	67
Total Span	72.94	73.46
Bending Passes	12	--
Crushing	--	6%



	Side A	Side B
Bending Passes	22	21
Crushing	5.97%	6.46%
Comments		

QC15 Inspection	DAS
Date	16/07/17 see pb para 1

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	09.07.30	Dimensions revised per Dwg Rev C	KJ	
C	12.04.16	Added bending, crushing dimensions	KJ	up

Item	Qty -141	Part Number	Description
1	X	D206-667-141	CROSSTUBE ASSEMBLY (206B HIGH FWD)
2	1	D6001-105	CROSSTUBE
3	2	D2873-043	NUT PLATE
4	2	D2873-045	NUT PLATE
5	2	D2891-1	SUPPORT
6	4	D3595-063-395	RUBBER CUSHION
7	4	MS21920-20	CLAMP (OR MS21920-21)
8	14	MS20601AD4W8	RIVET (OR NAS9302B-4-8)
9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6001-105
FINISHED LENGTH = 93.18±0.020
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D206-667-141" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 11.3 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN CUTTER OFF PART WHERE INDICATED. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 12 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2891-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-20 CLAMPS (OR -21) WITH D3595-063-395 RUBBER CUSHIONS TO SECURE THE D2891-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMP MECHANISMS ARE LOCATED ON CROSSTUBE SUPPORTS.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

86653

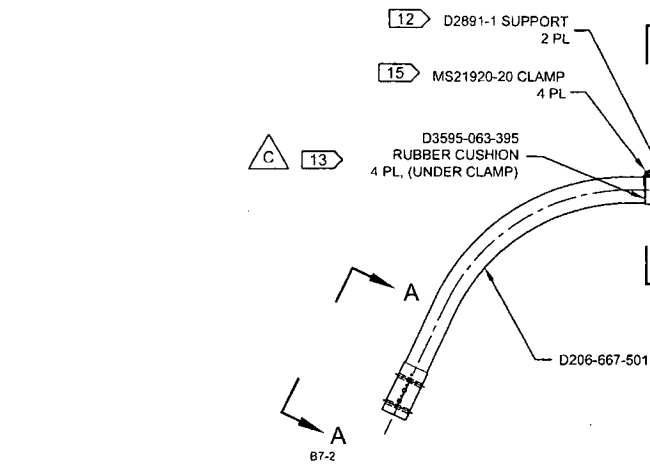
DEO ATTACHED

OCW#11-615
11.07.26

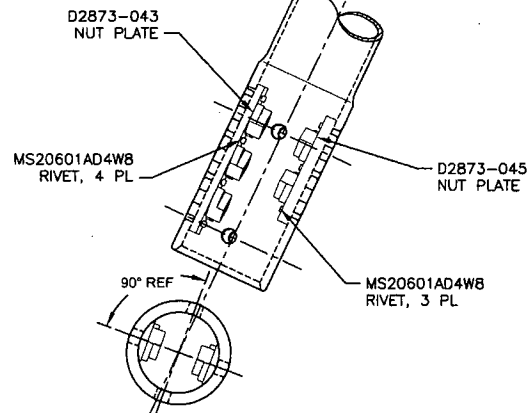
UNDER REVIEW

RELEASED
06/11/12

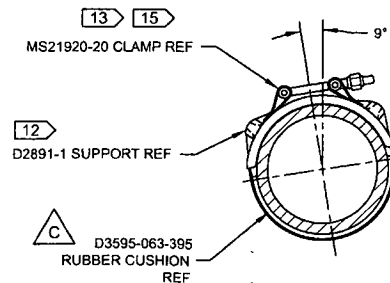
C	REVISE GENERAL NOTES/PART LIST (ZN D7-1); REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS. D3595-063-395 WAS D2856-400-694 (ZN D6-2 & A5-2); REMOVED REF. & ADD TOLERANCES (ZN C4-3, C5-3 & D3-3); RELOCATED FLAG #6 (ZN A5-3) PER NCR 210; MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4.	RF	08.11.06
B	ADD HOLES AND NUT PLATES FOR COMPATABILITY WITH BHT/AA SKUDTUBES	PH	05.07.26
A	NEW ISSUE	CP	00.11.17
REV.	DESCRIPTION	BY	DATE
DESIGN	RF	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF		
CHECKED	RF	DRAWING NO.	REV. C
MFG. APPR.	RF	D206-667-141	SHEET 1 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE ASSY (206B HIGH FWD)	NTS
DATE	08.11.06	<small>COPYRIGHT © 2005 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COMPILED OR DISSEMINATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	



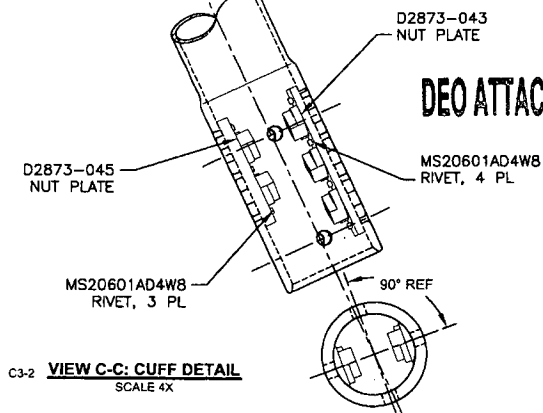
D206-667-141
ASSEMBLY DETAIL
(VIEW LOOKING FWD)



C6-2 **VIEW A-A: CUFF DETAIL**
SCALE 4X



D5-2 **SECTION B-B**
SCALE 5X



C3-2 **VIEW C-C: CUFF DETAIL**
SCALE 4X

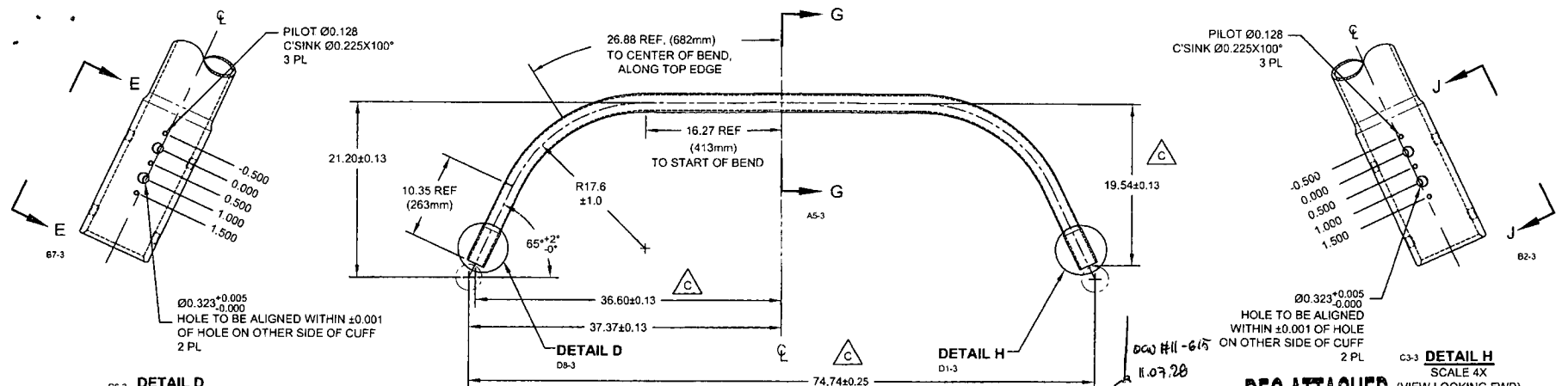
REV #11-615
11.07.28

UNDER REVIEW

RELEASED
08/11/2006

DEO ATTACHED

DESIGN	42	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	42	DRAWING NO.	REV. C
MFG. APPR.	42	D206-667-141	SHEET 2 OF 4
APPROVED	42	TITLE	SCALE
DE APPR.	42	CROSSTUBE ASS'Y (206B HIGH FWD)	NTS
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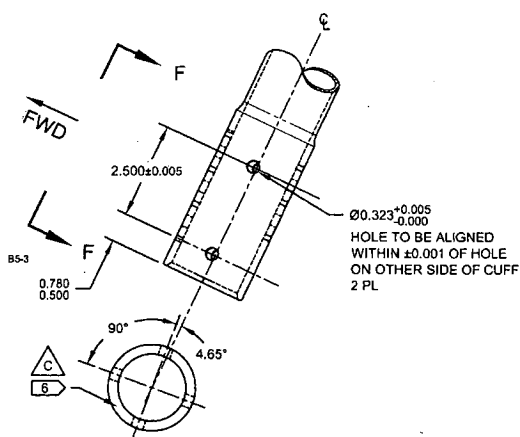


C6-3 **DETAIL D**
SCALE 4X
(VIEW LOOKING FWD)

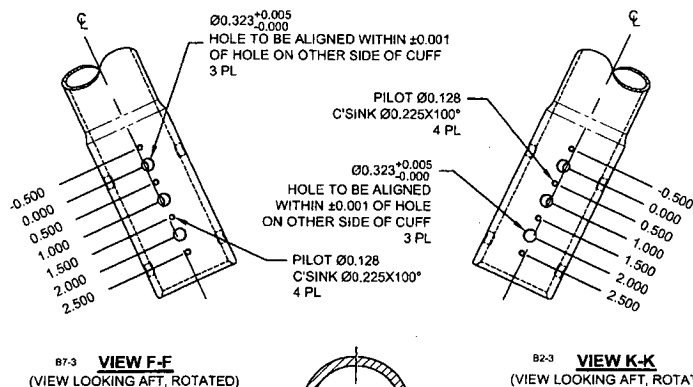
D206-667-501
BENDING AND DRILLING DETAIL
(VIEW LOOKING FWD)

C3-3 **DETAIL H**
SCALE 4X
(VIEW LOOKING FWD)

DEO ATTACHED
RELEASED
08/11/12

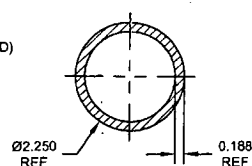


D8-3 **VIEW E-E:
CUFF DETAIL**
SCALE 4X

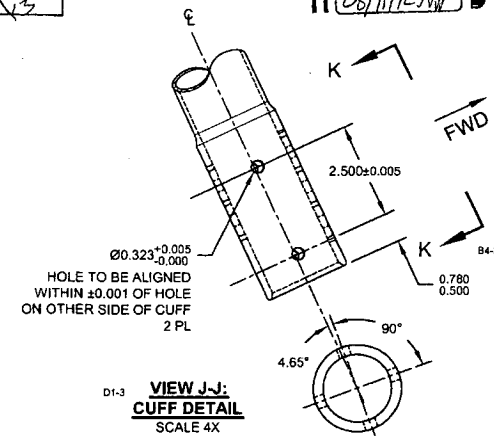


B7-3 **VIEW F-F**
(VIEW LOOKING AFT, ROTATED)

B2-3 **VIEW K-K**
(VIEW LOOKING AFT, ROTATED)

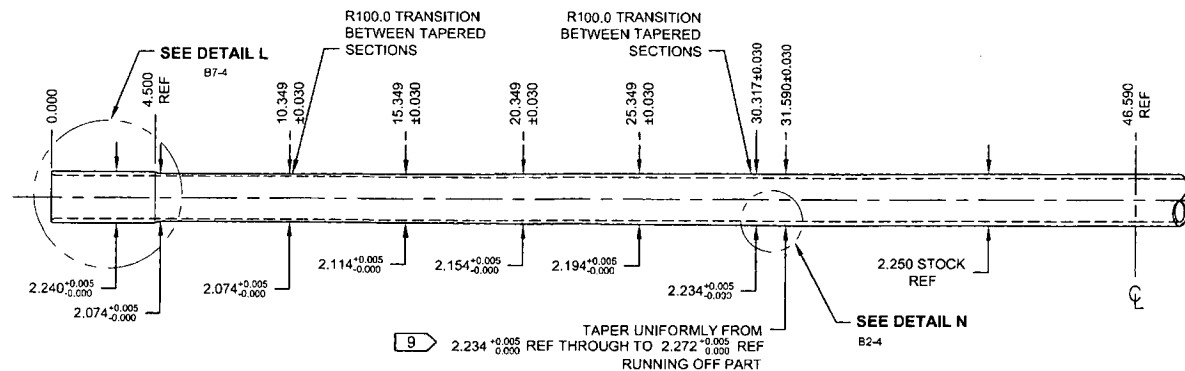


D4-3 **SECTION G-G**
SCALE 5X

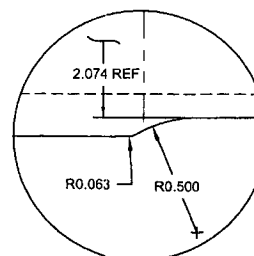


D1-3 **VIEW J-J:
CUFF DETAIL**
SCALE 4X

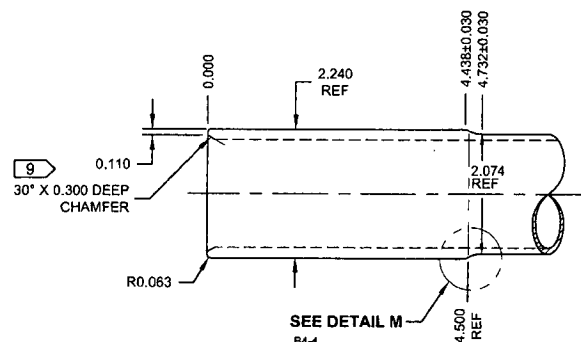
DESIGN	97	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	RF	DRAWING NO.	REV. C
MFG. APPR.	RF	D206-667-141	SHEET 3 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE ASS'Y (206B HIGH FWD)	NTS
DATE	08.11.06	COPYRIGHT © 2006 BY DART AEROSPACE LTD	
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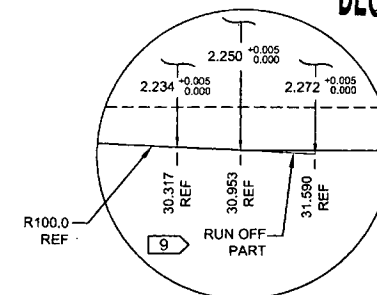
C TURNING DETAIL



**DETAIL M:
CUFF TRANSITION**
NOT TO SCALE



**DETAIL L:
CROSSTUBE CUFF**
NOT TO SCALE



**DETAIL N:
TAPER RUN-OFF**
NOT TO SCALE

REV 11-015
11.07.78
UNDER REVIEW
08/11/2008

DEO ATTACHED

RELEASED
08/11/2008

DESIGN	9P	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	JP	DRAWING NO.	REV. C
MFG. APPR.	JP	D206-667-141	SHEET 4 OF 4
APPROVED	JP	TITLE	SCALE
DE APPR.	JP	CROSSTUBE ASSY (206B HIGH FWD)	NTS
DATE	08.11.06	COPYRIGHT © 2008 BY DART AEROSPACE LTD	
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DRAWING NO. D206-667-141	TITLE CROSSTUBE ASS'Y (206B HIGH FWD)	REV. C	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D206-667-141-C-1	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN <i>q</i>	CHECKED <i>ASS</i>	MFG. APPR. <i>MD</i>	APPROVED <i>MD</i>		DE APPR. <i>MD</i>		
DATE 11.07.15	DATE 11.07.20	DATE 11.07.21	DATE 11/07/21		DATE 11.07.21		

PURPOSE:

REPLACE MAGNOBOND WITH PROSEAL.

CHANGE:

IS:

Item	Qty -141	Part Number	Description
9	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

WAS:

9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
---	-----	----------------	---

NOTE 12 & 15, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 12) TO INSTALL D2891-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. **PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.**

WAS:

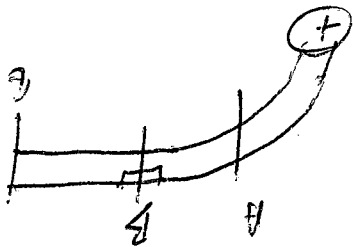
- 12) INSTALL D2891-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

RELEASED
2011-07-28
MD

STRESS REPORT

(CRUSHING OF D206-667-101

Acceptability of 8% CRUSHING



$$\text{Point A: } OD = 2.238 \quad OD_2 = 1.935$$

$$\text{CRUSHING} = (2.238 - 1.935) / (2.238 + 1.935) = 8\%$$

$$I = 0.263 \text{ in}^4 \text{ FROM AUTO CAD}$$

$$\text{Point B: } OD = 2.350 \quad ID = 1.874$$

$$I = 0.653 \text{ in}^4$$

$$A: F = Mc/I = P \times 10.8 \times 1906 / 2 \times 0.263 = 39.13 \text{ P}$$

$$= P \times 24.7 \times 2350 / 2 = 0.653 \times 41.86 \text{ P}$$

$$MS = 41.86 / 39.13 - 1 = 0.06$$

So Tube will break at support before area of 8% CRUSHING - 8% CRUSHING in area at end of band is acceptable

✓ Manual



LIQUID PENETRANT TEST REPORT

P- 12202

PAGE 1 OF 1

CLIENT DART Aerospace DATE Jul 14 2012 TIME AM ☒ PM ☐
ATTENTION ANDY / LINDA ACUREN JOB NO. 188-12-C0785
ADDRESS 1270 ABERDEEN ST. PO/WO No. 17504
HAWKESBURY, ON WORK LOCATION Same
ACCEPTANCE STD. ASTM 1417/051 REV./DATE 2005
PROJECT F.P.I. on cross tubes
ITEM(S) EXAMINED 11 - PCS

JOB DESCRIPTION PROCEDURE NO. LT002 REV./DATE 2008 TECHNIQUE NO. LT002 REV./DATE 2008
PART NO. SEE RESULTS MATERIAL ALUMINUM THICKNESS VARIOUS
SCOPE A WET FLOUORESCENT LIQUID PENETRANT EXAMINATION
WAS COMPLETED ON THE EXTERNAL SURFACE 100%

TEST DETAILS
METHOD ☒ FLUORESCENT ☐ VISIBLE ☒ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED
FAMILY BRAND MAGNAFLUX BLACK LIGHT S/N 16459 ☐ OUTPUT > 1000 μ W/cm² ☐ AMBIENT < 2 fc
PENETRANT DL67 MINIMUM DWELL TIME 9.5 MIN. LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER H2O MINIMUM DRY TIME >10 MIN. OTHER LABINO
DEVELOPER SKD 52 MINIMUM DWELL TIME 10 MIN. LIGHT METER S/N 1098866 CAL DUE DATE Jul 17, 2012
DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY

TEST SURFACE
SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☒ MACHINED ☐ SHOT BLASTED ☒ CLEAN BARE METAL
SURFACE TEMPERATURE ☐ < -4°C / 20°F ☐ -4°C / 20°F TO 10°C / 50°F ☒ 10°C / 50°F TO 52°C / 125°F ☐ > 52°C / 125°F

RESULTS- ☒ METRIC ☐ IMPERIAL

ITEM	DESCRIPTION	TEST RESULTS	REMARKS
1	CROSS REF. O.	85877	✓
1	"	86693	✓
1	"	86692	✓
1	"	84764	✓
1	"	86932	✓
1	"	87329	✓
1	"	87328	✓
1	"	85315	✓
1	"	85316	✓
1	"	85317	✓
1	"	85318	✓

ENGINEERING REQUEST - NCR
WAS ORIGINALLY NOT ON JUL 12/2012
Ref: P-10159
12-07-12

Scope of Services
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.
Standard of Care
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES
CLIENT REPRESENTATIVE Andy Sheldon PRINT SIGNATURE AS DTR # E117389
TECHNICIAN (SIGNATURE): Mike Ellison REPORT REVIEWED BY: AS
NAME (PRINT): Mike Ellison 1st TECHNICIAN 2nd TECHNICIAN
CGSB LEVEL # SNT LEVEL CGSB REG. NO. 6606 CGSB LEVEL CGSB REG. NO.

REFERENCE ONLY**5.0 PARTS LIST****5.1 HIGH GEAR CROSSTUBES**

Item	Qty -101	Qty -201	Qty -103	Qty -203	Qty -105	Qty -205	Part Number	Description
	X						D206-667-101	CROSSTUBE INSTALLATION, 206A/B HIGH FWD
		X					D206-667-201	CROSSTUBE INSTALLATION, 206A/B HIGH AFT
			X				D206-667-103	CROSSTUBE INSTALLATION, 206L/L-1/L-3/L-4 HIGH FWD
				X			D206-667-203	CROSSTUBE INSTALLATION, 206L/L-1/L-3/L-4 HIGH AFT
					X		D407-667-105	CROSSTUBE INSTALLATION, 407 HIGH FWD
						X	D407-667-205	CROSSTUBE INSTALLATION, 407 HIGH AFT
1	1						D206-667-141	CROSSTUBE ASSEMBLY, 206A/B HIGH FWD
2		1					D206-667-241	CROSSTUBE ASSEMBLY, 206A/B HIGH AFT
3			1				D206-667-143	CROSSTUBE ASSEMBLY, 206L/L-1/L-3/L-4 HIGH FWD
4				1			D206-667-243	CROSSTUBE ASSEMBLY, 206L/L-1/L-3/L-4 HIGH AFT
5					1		D407-667-145	CROSSTUBE ASSEMBLY, 407 HIGH FWD
6						1	D407-667-245	CROSSTUBE ASSEMBLY, 407 HIGH AFT
10	*2	*2	*2		*2		D2891-1	SUPPORT
11				*2			D2892-1	SUPPORT
12						*1	D2894-1	SUPPORT
13	*4	*4	*4		*4		D3595-063-395	RUBBER CUSHION
14				*4			D3595-063-450	RUBBER CUSHION
15						*2	D3595-075-430	RUBBER CUSHION
16	*4	*4	*4		*4		MS21920-20	CLAMP
17				*4		*4	MS21920-22	CLAMP
18						*2	MS21920-25	CLAMP (OR MS21920-24)
19	4	4	4		4		AN5-32A	BOLT
20				4		4	AN5-34A	BOLT
21	4	4	4	4	4	4	MS21042L5	NUT (OR MS21042-5)
22	8	8	8	8	8	8	NAS1149C0563J	WASHER (OR AN960JD516)
23						*2	D3190-1	CHAFING SHIELD
40	*2		*2	*2	*2	*2	D2873-043	NUT PLATE
41	*2		*2	*2	*2	*2	D2873-045	NUT PLATE
42		2					D2872-043	NUT PLATE
43		2					D2872-045	NUT PLATE
44	10		10				AN5-7A	BOLT
45		10		10	10	10	AN5-10A	BOLT
46	4	10	4		4		AN5-30A	BOLT
47				4		4	AN5-32A	BOLT
48			12				AN970-4	WASHER (OPTIONAL)
49		6					MS21042L5	NUT (OR MS21042-5)
50	10	12	10	10	10	10	NAS1149C0563J	WASHER (OR AN960JD516)
60		1					D3039-3	CENTER DRILL (TOOLING, NOT INSTALLED)

*REFERENCE ONLY. PARTS ARE INCLUDED IN D206-667-141/-143/-241/-243 & D407-667-145/-245 ASSEMBLIES ABOVE

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Revision: **D**

Date: 11.05.01